



Multifamily Rehabilitation

Lesson Rehabilitating existing buildings should begin with a careful building evaluation, building testing, and identification of building performance goals. When work is completed, conduct testing to verify goals have been achieved.

Relevant Green Communities Criteria:

- 5.1b Efficient Energy Use**
- 7.5 Exhaust Fans**
- 7.6 Ventilation**

Goal Cost-effective renovation of existing housing stock, focusing on improving what needs improvement, preserving what functions well, and ensuring the long term durability of the projects.

What Happened Viking Terrace was originally planned as a “standard” rehab, but was designed to be “green ready” if funding could be identified. Those green upgrades were added after design was completed, thanks to funding by Minnesota Green Communities. As a “standard” rehab, there was no formal pre-assessment, nor was any post-testing planned.

After completing Viking Terrace in 2007, Green Communities’ building performance testing provided detailed feedback on the improvements on the building. Southwest Minnesota Housing Partnership (SWMHP) realized that they could have achieved better energy efficiency and indoor air quality results for less money if an expert had completed more thorough evaluation of the existing building prior to preparing the design. As a result, they changed their approach on Cherry Ridge in 2008 to include pre-construction testing, and their approach is being further refined on their third green rehab project, Orness Plaza. As SWMHP executive director Rick Goodemann put it, “Now, every project is a research project. We ask ourselves, ‘What can we learn from this project?’”

On Cherry Ridge, SWMHP worked with the Center for Energy and Environment (CEE) to develop a scope of work. CEE looked at the building, did some basic testing, and developed a report listing what the building needed and suggesting modifications. They also evaluated the potential to use solar hot water for heating via the existing boiler system for domestic hot water (showers, etc.). SWMHP feels this resulted in a significantly more cost-effective work scope, specific energy conservation goals, and expected pay-backs. However, there were some challenges in getting buy-in by all members of the development team and construction crew, and they believe that better construction monitoring on energy detailing could have improved the results.

On their current project, Orness Plaza, SWMHP is expanding CEE’s involvement further by including them in a charrette in order to build stronger buy-in by all development and construction team members, in particular the engineers. They are also hiring CEE to perform construction monitoring (of energy efficiency and indoor air quality detailing) and commissioning after construction is complete. This means CEE will do the evaluation of water conservation and energy performance, and their final report will benchmark the building performance to the pre-construction evaluation goals based on their assessment.

SWMHP noted that funding standards create a barrier to pre-assessment and commissioning because the costs are defined as “intermediary expense” or soft costs. This definition results in a choice between 1) reducing the development fee, 2) commissioning, or 3) tax credit points (and the loss of points may mean no funding and therefore no project). SWMHP has chosen to invest in better building assessment, construction monitoring, and post-construction commissioning because they see the value, despite the funding challenges. SWMHP believes the value is so great that pre-assessment and commissioning should be incentivized by defining them as construction expenses rather than intermediary expenses.

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Recommendations

Begin project planning with a detailed, expert pre-construction building evaluation that examines the building as a system. This will help determine the most beneficial and achievable goals, identify the most effective strategies to achieve specific goals, limit unintended consequences, and ensure durability—whether the goal is to improve energy efficiency, water efficiency, or indoor air quality. It also allows for evaluating whether goals have been met; without identifying where the building began, it's hard to know whether goals have been achieved.

Use the pre-construction evaluation to identify critical issues, including current mechanical needs and duct system improvements. Avoid jumping to mechanical system conclusions about what will be more efficient. The analysis will help you identify the incremental costs and benefits of different systems to select the best one for your building. This is also an opportunity to plan for effective ventilation, setting air flow change rate goals and evaluating whether the current system can meet them, or identifying what improvements will be needed.

The evaluation should include:

- analysis of at least one full year of utility bills;
- field tests including blower door tests, duct blasting, and ventilation flows; and,
- radon testing to determine whether mitigation is needed.

Take Away

Have careful energy and indoor air quality evaluation completed by a building performance expert to identify the most cost-effective and important work scope items to achieve a durable, energy efficient, healthy, comfortable building after rehab. If possible, hire someone to assist with construction monitoring on the energy efficiency and indoor air quality items, and commission the building at the end to be sure you got what you paid for.

LESSONS LEARNED Minnesota Green Communities Demonstration Projects

This publication is part of a series of lessons learned originating from Minnesota Green Communities demonstration projects. The Minnesota Green Communities initiative is currently the largest green building program in Minnesota, with 497 units completed, 908 under construction, and another 1,645 under development. Eight demonstration projects were funded through the Minnesota Green Communities program. The initiative is completing building performance testing on the demonstration projects, and has gathered lessons learned in several areas.

The Lessons Learned series includes the following publications: Integrated Design, Multifamily Green Rehabilitation, Construction Training and Monitoring, Ductwork, Duct Design, Duct Sealing, Kitchen Ventilation, Radon Testing and Mitigation, Pressure Balancing Between Rooms, Water Efficiency, and Cost Increase Triggers in Plans and Specifications. All publications can be found online at www.mngreencommunities.org.



Minnesota Green Communities, a collaboration of the Greater Minnesota Housing Fund, the Family Housing Fund, and Enterprise, is an initiative designed to foster the creation of affordable, healthier, and more energy-efficient housing throughout Minnesota. The initiative will support the production of affordable housing with markedly reduced energy costs, use of materials beneficial to the environment, conservation-minded land use planning, and attention to the creation of healthy environments and lifestyles for individuals, children, families, and communities. For more information, please visit www.mngreencommunities.org.

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